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BEFORE THE BOARD OF PATENT APPEALS AND INTERFERENCES

Application Number: 09/747,786
Filing Date: December 22, 2000
Appellant(s): BERNARDO ET AL.

Paul J. Ditmyer
For Appellant

EXAMINER'S ANSWER

This is in response to the appeal brief filed on December 29th, 2005 appealing from the Office action mailed July 22nd, 2005.

(2) Related Appeals and Interferences

The examiner is not aware of any related appeals, interferences, or judicial proceedings which will directly affect or be directly affected by or have a bearing on the Board's decision in the pending appeal.

(3) Status of Claims

The statement of the status of claims contained in the brief is correct.

(4) Status of Amendments After Final

No amendment after final has been filed.

(5) Summary of Claimed Subject Matter

The summary of claimed subject matter contained in the brief is correct.

(6) Grounds of Rejection to be Reviewed on Appeal

The appellant's statement of the grounds of rejection to be reviewed on appeal is correct.

(7) Claims Appendix

The copy of the appealed claims contained in the Appendix to the brief is correct.

(8) Evidence Relied Upon

5923760	Abarbanel et al.	7-1999
5847960	Cutler et al.	12-1998
6016078	Giacomini	01-2000
4590942	Brenman et al.	05-1986

Applicant Admitted Prior Art

Lee et al.; "Secure Communication Using Chaos"; IEEE Global Telecommunications Conference; Globecom '95; Nov. 1995; Pages 1183-1187

(9) Grounds of Rejection

The following ground(s) of rejection are applicable to the appealed claims:

1. Claims 9, 25 (apparatus, method), 12, 28 (apparatus, method) are rejected under 35 U.S.C. 103(a) as being unpatentable over Abarbanel at al. (5,923,760) in view of J. Lee et al. (Secure Communication Using Chaos, IEEE Global Telecommunications Conference, Globecom '95, November 1995, Pages 1183-1187). This rejection is set forth in a prior Office Action, mailed on July 22nd, 2005. The rejections are hereby reproduced for convenience.

Regarding to Claims 9, 25 (apparatus, method), 12, 28 (apparatus, method), Abarbanel discloses a chaotic communication system for use in a wired or wireless transmission links (Abstract, lines 1-17 & Column 1, lines 12-45 & Column 2, lines 41-67 & Column 3, lines 1-67) comprising a transmission channel (Fig. 1, element 26 & Fig. 4, element 51 & Fig. 5, element 80); a signal source for providing a discrete signal (Fig. 4, element 40 & Fig. 5, element 66); a chaotic modulator for modulating the discrete signal for transmitting over said transmission channel (Fig. 4, element 44 & Fig. 5, element 68); and a discriminator (receiver) for receiving the modulated discrete signal from said transmission channel (Fig. 4, element 56 & Fig. 5, element 84). Abarbanel further discloses the use of filters in chaotic systems, which serve to suppress large spike components at specific frequencies (Column 1,

lines 65-67 & Column 2, lines 1-5). However Abarbanel does not disclose the receiver to be an in coherent (self-synchoronizing) receiver.

Lee discloses a secure communications scheme using a chaotic communications system. Lee also discloses determining the data stream by comparing the power level of the dynamical error of each data stream (Page 1183, Abstract, lines 2-17 & Page 1187, Fig. 2-3). Lee further discloses that the advantage of the comparing the level to determine the received signal is that it does not require the synchronization of the receiver to the transmitter (Page 1183, Abstract, lines 8-17 & Page 1184, left-hand column, lines 1-11). Therefore, it would have been obvious to one of ordinary skill in the art at the time of the invention that Lee teaches implementing a chaos modulator and an incoherent receiver to receive the transmitted signal and this can be implemented in the chaotic communication system as described in Abarbanel so as to provide a receiver so as to minimize the effect of the initial conditions and synchronization errors in the demodulation of the signal received at low SNR.

2. Claims 10, 26 (apparatus, method), 11, 27 (apparatus, method), 17, 18 & 19 are rejected under 35 U.S.C. 103(a) as being unpatentable over Abarbanel at al. (5,923,760) in view of J. Lee et al. (Secure Communication Using Chaos, IEEE Global Telecommunications Conference, Globecom '95, November 1995, Pages 1183-1187) in further view of Cutler et al. (5,847,960). This rejection is set forth in a prior Office Action, mailed on July 22nd, 2005. The rejections are hereby reproduced for convenience.

Regarding to Claims 10, 26, Abarbanel in view of Lee discloses a chaotic communication system for use in a wired or wireless transmission links as described above. Abarbanel further discloses implementing a filter at the receiver (Figure 1, element 28), which serve to suppress components of the noise at specified frequencies (Column 1, lines 65-67). Abarbanel also discloses that the frequency bandwidth of available transmission links lack a low frequency response with an inability to transmit dc-signals, and have a high frequency cutoff defining the upper end of the band (Column 2, lines 15-26). Abarbanel discloses a bandpass characteristic of the transmission channel and implementing a bandpass filter at the receiver (discriminator) so as to synchronize the receiver with the transmitted signal and allowing the demodulation of the received signal (Column 2, lines 40-55 & Column 4, lines 25-35 & Claim 6). However, Abarbanel does not disclose a rectifier connected to the high-pass filter and further a low-pass filter connected to the output of the rectifier.

Lee discloses a secure communications scheme using a chaotic communications system. Lee also discloses determining the data stream by comparing the power level of the dynamical error of each data stream (Page 1183, Abstract, lines 2-17 & Page 1187, Fig. 2-3). Lee further discloses maximally correlating the received signal to determine the cost function for determining the received signal (Page 1184, right-hand column, lines 1-55, Equation 4 & Page 1185, Equations 6-7 & 11). Therefore, it would have been obvious to one of ordinary skill in the art at the time of the invention that it is possible to implement the demodulation of maximally correlating

the received signal as described in Lee in the system as described in Abarbanel perform the same function as a rectifier but digitally since the process of maximally correlation is equivalent to rectification. Furthermore, there is no criticality in implementing a high pass filter at the front end of the receiver and as described in Abarbanel a bandpass filter performs the same function furthermore, a bandpass filter can be implemented using a high pass filter. However, Abarbanel in view of Lee does not disclose a low pass filter connected to the output of the rectifier.

Cutler discloses a fourth-order low pass filter to provide good smoothing while keeping the implementation simple (Column 9, lines 19-38, 65-67 & Column 10, lines 1-6). Therefore, it would have been obvious to one of ordinary skill in the art at the time of the invention that implementing the low pass filter as described in Cutler after the rectifier (correlator) as described in Abarbanel in view of Lee provides a smoothed and stable signal while keeping the overall filter implementation simple.

Regarding to Claims 11, 27, Abarbanel in view of Lee in further view of Cutler discloses a chaotic communication system for use in a wired or wireless transmission links comprising high pass and low pass filters and a correlator (rectifier) as described above. Lee further discloses comparing the power level of the dynamical errors of the data stream with a chosen threshold (Page 1184, right-hand column, lines 35-55, Equation 4 & Page 1187, Fig. 3). Therefore, it would have been obvious to one of ordinary skill in the art at the time of the invention that Abarbanel in view of Lee in further view of Cutler satisfies the limitation of the claim.

Regarding to Claim 17, Abarbanel in view of Lee discloses a chaotic communication system for use in a wired or wireless transmission links (Abstract, lines 1-17 & Column 1, lines 12-45 & Column 2, lines 41-67 & Column 3, lines 1-67) comprising a transmission channel (Fig. 1, element 26 & Fig. 4, element 51 & Fig. 5, element 80); a signal source for providing a discrete signal (Fig. 4, element 40 & Fig. 5, element 66); a chaotic modulator for modulating the discrete signal for transmitting over said transmission channel (Fig. 4, element 44 & Fig. 5, element 68); and an incoherent discriminator for receiving the modulated discrete signal from said transmission channel (Fig. 4, element 56 & Fig. 5, element 84). Abarbanel further discloses implementing a filter at the receiver (Figure 1, element 28), which serve to suppress components of the noise at specified frequencies (Column 1, lines 65-67). Abarbanel also discloses that the frequency bandwidth of available transmission links lack a low frequency response with an inability to transmit dc-signals, and have a high frequency cutoff defining the upper end of the band (Column 2, lines 15-26). Abarbanel discloses a bandpass characteristic of the transmission channel and implementing a bandpass filter at the receiver (discriminator) so as to synchronize the receiver with the transmitted signal and allowing the demodulation of the received signal (Column 2, lines 40-55 & Column 4, lines 25-35 & Claim 6). However, Abarbanel does not disclose a rectifier connected to the high-pass filter and further a low-pass filter connected to the output of the rectifier.

Lee discloses a secure communications scheme using a chaotic communications system. Lee also discloses determining the data stream by comparing the power level of the dynamical error of each data stream (Page 1183, Abstract, lines 2-17 & Page 1187, Fig. 2-3). Lee further discloses maximally correlating the received signal to determine the cost function for determining the received signal (Page 1184, right-hand column, lines 1-55, Equation 4 & Page 1185, Equations 6-7 & 11). Therefore, it would have been obvious to one of ordinary skill in the art at the time of the invention that it is possible to implement the demodulation of maximally correlating the received signal as described in Lee in the system as described in Abarbanel perform the same function as a rectifier but digitally since the process of maximally correlation is equivalent to rectification. Furthermore, there is no criticality in implementing a high pass filter at the front end of the receiver and as described in Abarbanel a bandpass filter performs the same function, furthermore a bandpass filter can be implemented using a high pass filter. However, Abarbanel in view of Lee does not disclose a low pass filter connected to the output of the rectifier.

Cutler discloses a fourth-order low pass filter to provide good smoothing while keeping the implementation simple (Column 9, lines 19-38, 65-67 & Column 10, lines 1-6). Therefore, it would have been obvious to one of ordinary skill in the art at the time of the invention that implementing the low pass filter as described in Cutler after the rectifier (correlator) as described in Abarbanel in view of Lee provides a smoothed and stable signal while keeping the overall filter implementation simple.

Regarding to Claims 18, Abarbanel in view of Lee in further view of Cutler discloses a chaotic communication system for use in a wired or wireless transmission links comprising high pass and low pass filters and a correlator (rectifier) as described above. Lee further discloses comparing the power level of the dynamical errors of the data stream with a chosen threshold (Page 1184, right-hand column, lines 35-55, Equation 4 & Page 1187, Fig. 3). Therefore, it would have been obvious to one of ordinary skill in the art at the time of the invention that Abarbanel in view of Lee in further view of Cutler satisfies the limitation of the claim.

Regarding to Claims 19, Abarbanel in view of Lee in further view of Cutler discloses a chaotic communication system for use in a wired or wireless transmission links comprising high pass and low pass filters, and a correlator (rectifier) as described above. Abarbanel further discloses a chaotic communication system for use in a wired or wireless transmission links as described above. Abarbanel further discloses the receiver (discriminator) to be self-synchronizing (Column 1, lines 35-46 & Column 3, lines 37-51 & Column 4, lines 42-45). Therefore, it would have been obvious to one of ordinary skill in the art at the time of the invention that Abarbanel in view of Lee in further view of Cutler satisfies the limitations of the claim.

3. Claims 13, 29 (apparatus, method), are rejected under 35 U.S.C. 103(a) as being unpatentable over Abarbanel at al. (5,923,760) in view of Lee (Secure Communication Using Chaos, IEEE Global Telecommunications Conference, Globecom '95, November 1995, Pages 1183-1187) in further view of Applicant

Admitted Prior Art (AAPA). This rejection is set forth in a prior Office Action, mailed on July 22nd, 2005. The rejections are hereby reproduced for convenience.

Regarding to Claims 13, 29, Abarbanel in view of Lee discloses a chaotic communication system for use in a wired or wireless transmission links comprising an incoherent receiver as described above. However, Abarbanel does not specify the signal source to generate a low logic value signal having associated a chaotic evolution corresponding to a complete Chua's attractor and further the low logic value corresponding to a left-hand lobe of the Chua's attractor.

The Applicant Admitted Prior Art (AAPA) discloses a chaotic communication system (Specification, Page 4, lines 30-35 & Page 5, lines 1-11) comprising a modulation method called chaos shift keying wherein one of two chaotic signals generated by two different systems or the same system are associated with a low logic value and a high logic value is transmitted (Specification, Page 5, lines 28-34). The AAPA further discloses a low logic value corresponding to a left-hand lobe of the Chua's attractor (Specification, Page 10, lines 15-30 & Figure 8-9). Therefore, it would have been obvious to one of ordinary skill in the art at the time of the invention that the modulation scheme as described in the AAPA can be implemented in the chaotic system as described in Abarbanel in view of Lee to provide distinct chaotic signals for the high and low logic values, thus satisfying the limitations of the claim.

4. Claims 14, 30 (apparatus, method), 16, 32 (apparatus, method), 21 & 24 are rejected under 35 U.S.C. 103(a) as being unpatentable over Abarbanel at al.

(5,923,760) in view of Lee (Secure Communication Using Chaos, IEEE Global Telecommunications Conference, Globecom '95, November 1995, Pages 1183-1187) in further view of Cutler et al. (5,847,960) in further view of Giacomini (6,016,078) in further view of Brenman et al. (4,590,942). This rejection is set forth in a prior Office Action, mailed on July 22nd, 2005. The rejections are hereby reproduced for convenience.

Regarding to Claims 14, 30 & 16, 32, Abarbanel in view of Lee discloses a chaotic communication system for use in a wired or wireless transmission links comprising an incoherent receiver as described above. However, Abarbanel in view of Lee does not disclose the discriminator (receiver) to comprise a low pass filter.

Cutler discloses a fourth-order low pass filter to provide good smoothing while keeping the implementation simple (Column 9, lines 19-38, 65-67 & Column 10, lines 1-6). Therefore, it would have been obvious to one of ordinary skill in the art at the time of the invention that implementing the low pass filter as described in Cutler after the rectifier (correlator) as described in Abarbanel in view of Lee provides a smoothed and stable signal while keeping the overall filter implementation simple. However, Abarbanel in view of Lee in further view of Cutler does not disclose a null-threshold comparator connected to the output of the low pass filter for providing a square wave output.

Giacomini discloses a low offset output null-threshold comparator to output a square-wave signal for high precision output despite varying operating conditions such as temperature, supply voltage, bias current etc. Therefore, it would have

been obvious to one of ordinary skill in the art at the time of the invention that the null-threshold comparator as described in Giacomini can be implemented in the receiver circuit as described in Abarbanel in view of Cutler so as to compare the multiple voltages to a threshold value so as to determine the validity of the received signal. However, Abarbanel in view of Lee in further view of Cutler in further view of Giacomini does not disclose a divider connected to the output of the comparator for scaling the square wave output signal.

Brenman discloses a divider circuit (Fig. 5, element 84 & Fig. 5a, element 86-88) to provide amplitude control for the output signal (Column 5, lines 40-50). Therefore, it would have been obvious to one of ordinary skill in the art at the time of the invention that the divider as described in Brenman can be implemented at the output of the comparator as described in Abarbanel in view of Lee in further view of Cutler in further view of Giacomini so as to control the output amplitude of the comparator to a desired value, thus Abarbanel in view of Cutler in further view of Giacomini in further view of Brenman satisfies the limitation of the claim.

Regarding to Claims 21 & 24, Abarbanel discloses a chaotic communication system for use in a wired or wireless transmission links (Abstract, lines 1-17 & Column 1, lines 12-45 & Column 2, lines 41-67 & Column 3, lines 1-67) comprising a transmission channel (Fig. 1, element 26 & Fig. 4, element 51 & Fig. 5, element 80); a signal source for providing a discrete signal (Fig. 4, element 40 & Fig. 5, element 66); a chaotic modulator for modulating the discrete signal for transmitting over said transmission channel (Fig. 4, element 44 & Fig. 5, element 68); and a discriminator

for receiving the modulated discrete signal from said transmission channel (Fig. 4, element 56 & Fig. 5, element 84). However, Abarbanel does not disclose the discriminator (receiver) to be an incoherent receiver.

Lee discloses a secure communications scheme using a chaotic communications system. Lee also discloses determining the data stream by comparing the power level of the dynamical error of each data stream (Page 1183, Abstract, lines 2-17 & Page 1187, Fig. 2-3). Lee further discloses that the advantage of the comparing the level to determine the received signal is that it does not require the synchronization of the receiver to the transmitter (Page 1183, Abstract, lines 8-17 & Page 1184, left-hand column, lines 1-11). Therefore, it would have been obvious to one of ordinary skill in the art at the time of the invention that Lee teaches implementing a chaos modulator and an incoherent receiver to receive the transmitted signal and this can be implemented in the chaotic communication system as described in Abarbanel so as to provide a receiver so as to minimize the effect of the initial conditions and synchronization errors in the demodulation of the signal received at low SNR. Abarbanel in view of Lee does not disclose the discriminator (receiver) to comprise a low pass filter.

Cutler discloses a fourth-order low pass filter to provide good smoothing while keeping the implementation simple (Column 9, lines 19-38, 65-67 & Column 10, lines 1-6). Therefore, it would have been obvious to one of ordinary skill in the art at the time of the invention that implementing the low pass filter as described in Cutler after the rectifier (correlator) as described in Abarbanel in view of Lee provides a

smoothed and stable signal while keeping the overall filter implementation simple. However, Abarbanel in view of Lee in further view of Cutler does not disclose a null-threshold comparator connected to the output of the low pass filter for providing a square wave output.

Giacomini discloses a low offset output null-threshold comparator to output a square-wave signal for high precision output despite varying operating conditions such as temperature, supply voltage, bias current etc. Therefore, it would have been obvious to one of ordinary skill in the art at the time of the invention that the null-threshold comparator as described in Giacomini can be implemented in the receiver circuit as described in Abarbanel in view of Lee in further view of Cutler so as to compare the multiple voltages to a threshold value so as to determine the validity of the received signal. However, Abarbanel in view of Lee in further view of Cutler in further view of Giacomini does not disclose a divider connected to the output of the comparator for scaling the square wave output signal.

Brenman discloses a divider circuit (Fig. 5, element 84 & Fig. 5a, element 86-88) to provide amplitude control for the output signal (Column 5, lines 40-50). Therefore, it would have been obvious to one of ordinary skill in the art at the time of the invention that the divider as described in Brenman can be implemented at the output of the comparator as described in Abarbanel in view of Lee in further view of Cutler in further view of Giacomini so as to control the output amplitude of the comparator to a desired value, thus Abarbanel in view of Lee in further view of Cutler in further view of Giacomini in further view of Brenman satisfies the limitation of the claim.

5. Claims 15, 31 (apparatus, method), 22 & 23, are rejected under 35 U.S.C. 103(a) as being unpatentable over Abarbanel at al. (5,923,760) in view of Lee (Secure Communication Using Chaos, IEEE Global Telecommunications Conference, Globecom '95, November 1995, Pages 1183-1187) in further view of Cutler et al. (5,847,960) in further view of Giacomini (6,016,078) in further view of Brenman et al. (4,590,942) in further view of Applicant Admitted Prior Art (AAPA). This rejection is set forth in a prior Office Action, mailed on July 22nd, 2005. The rejections are hereby reproduced for convenience.

Regarding to Claims 15, 31, 22 & 23, Abarbanel in view of Lee in further view of Cutler in further view of Giacomini in further view of Brenman discloses a chaotic communication system for use in a wired or wireless transmission links comprising an incoherent receiver further comprising a low pass filter, null-threshold comparator, and a divider as described above. However, these references do not disclose a signal source to generate a low logic value signal that is associated with a chaotic dynamics corresponding to a left-hand lobe of a Chua's attractor.

The Applicant Admitted Prior Art (AAPA) discloses a chaotic communication system (Specification, Page 4, lines 30-35 & Page 5, lines 1-11) comprising a modulation method called chaos shift keying wherein one of two chaotic signals generated by two different systems or the same system are associated with a low logic value and a high logic value is transmitted (Specification, Page 5, lines 28-34). The AAPA further discloses a low logic value corresponding to a left-hand lobe of the Chua's attractor (Specification, Page 10, lines 15-30 & Figure 8-9). Therefore, it

would have been obvious to one of ordinary skill in the art at the time of the invention that the modulation scheme as described in the AAPA can be implemented in the chaotic system as described in Abarbanel in view of Cutler in further view of Giacomini in further view of Brenman to provide distinct chaotic signals for the high and low logic values, thus satisfying the limitations of the claim.

6. Claim 20 is rejected under 35 U.S.C. 103(a) as being unpatentable over Abarbanel at al. (5,923,760) in view of J. Lee et al. (Secure Communication Using Chaos, IEEE Global Telecommunications Conference, Globecom '95, November 1995, Pages 1183-1187) in further view of Cutler et al. (5,847,960) in further view of Applicant Admitted Prior Art (AAPA). This rejection is set forth in a prior Office Action, mailed on July 22nd, 2005. The rejections are hereby reproduced for convenience.

Regarding to Claim 20, Abarbanel in view of Lee in further view of Cutler discloses a chaotic communication system for use in a wired or wireless transmission links comprising an incoherent receiver further comprising high pass and low pass filters, and a correlator (rectifier) as described above. However, the above references do not specify the signal source to generate a low logic value signal having associated a chaotic evolution corresponding to a complete Chua's attractor and further the low logic value corresponding to a left-hand lobe of the Chua's attractor.

The Applicant Admitted Prior Art (AAPA) discloses a chaotic communication system (Specification, Page 4, lines 30-35 & Page 5, lines 1-11) comprising a

modulation method called chaos shift keying wherein one of two chaotic signals generated by two different systems or the same system are associated with a low logic value and a high logic value is transmitted (Specification, Page 5, lines 28-34). The AAPA further discloses a low logic value corresponding to a left-hand lobe of the Chua's attractor (Specification, Page 10, lines 15-30 & Figure 8-9). Therefore, it would have been obvious to one of ordinary skill in the art at the time of the invention that the modulation scheme as described in the AAPA can be implemented in the chaotic system as described in Abarbanel in view of Lee in further view of Cutler to provide distinct chaotic signals for the high and low logic values, thus satisfying the limitations of the claim.

(10) Response to Argument

7. In regards to the arguments presented the Abarbanel at al. (5,923,760) reference <u>discloses all the limitations as recited</u> in the claims 9, 12, 25 & 28 i.e. a communication system comprising a transmission channel a signal source for providing a discrete signal and a chaotic modulator. Furthermore, the limitations of a transmission channel and a signal source are <u>also</u> inherent to any communication system since a source is required to provide the information needed to be communicated and further a communication channel is inherent since the information needs to be transmitted over a channel so as to communicate the information. The Abarbanel reference further discloses the communication system to include a chaotic modulator (Fig. 4, element 44 & Fig. 5, element 68). Abarbanel further discloses the use of filters in chaotic systems,

which serve to suppress large spike components at the specified frequencies (Column 1, lines 65-67 & Column 2, lines 1-5). However, Abarbanel does not disclose the receiver in the communication system to be an in coherent (self-synchoronizing) receiver.

The Appeal Brief (Argument, Page 5, Paragraph 1, lines 3-8) discloses that an incoherent discriminator allows the discrete signal to be reconstructed using a structure that is different than the structure used to modulate the discrete signal for transmission over the transmission channel. This is interpreted not only that the incoherent discriminator is different in terms of components (structure) but also allows reconstructing of the transmitted signal by not synchronizing to the transmitter (self-synchronizing) or having knowledge of the transmitter.

This limitation is taught in the Lee et al. (Secure Communication Using Chaos, IEEE Global Telecommunications Conference, Globecom '95, November 1995, Pages 1183-1187) which discloses a secure communications scheme using a chaotic communications system (Abstract, line 1). Lee further discloses the receiver to be an incoherent (self-synchronizing) receiver (Abstract, lines 6-16 & Page 1184, left-column, lines 1-10). Lee also discloses determining the data stream by comparing the power level of the dynamical error of each data stream (Page 1183, Abstract, lines 2-17 & Page 1187, Fig. 2-3). Lee further discloses that the advantage of the comparing the level to determine the received signal is that it does not require the synchronization of the receiver to the transmitter or knowledge of the transmitter (Page 1183, Abstract, lines 8-17 & Page 1184, left-hand column, lines 1-

11). Lee further discloses a chaotic modulator to transmit chaotic signals modulating the data bits (Page 1183, right-column, lines 32-39). Furthermore, the Applicant in (Argument, Page 6, lines 30-33 & Page 7, lines 1-2) discloses that the Lee reference "...does not require synchronization of the receiver to the transmitter...", therefore the receiver in the Lee reference is an incoherent discriminator. Therefore, it would have been obvious to one of ordinary skill in the art at the time of the invention that Lee teaches implementing a chaos modulator and an incoherent receiver to receive the transmitted signal and this can be implemented in the chaotic communication system as described in Abarbanel so as to minimize the effect of the initial conditions and synchronization errors in the demodulation of the signal received at low SNR and high noise channel conditions, thus providing a robust chaotic receiver. Therefore, Abarbanel in view of Lee indeed satisfies the limitations of the claims.

In Regards to the argument presented in the Appeal Brief regarding the independent claims 9 & 25 (Argument, Page 6, lines 16) that "...the combination of references fails to produce the claimed invention, and the Examiner is using impermisable hindsight reconstruction to selectively combine the disjointed prior art references in an attempt to produce the claimed invention in a manner that is not fairly taught or suggested by the prior art.", this is incorrect. Firstly, the references used in the rejection of the above-mentioned claims are not disjointed, both references disclose implementing a chaotic communications systems comprising a chaotic modulator and demodulator. Furthermore, as stated above the Abarbanel reference further discloses the communication system to include a chaotic

modulator. Abarbanel further discloses the use of filters in chaotic systems, which serve to suppress large spike components at the specified frequencies. However, this reference discloses a coherent receiver. This limitation is provided by the Lee reference as stated above. Furthermore, there has been provided a motivation to combine the references so as to implement the incoherent discriminator (receiver) as described in the Lee reference to the system as described in the Abarbanel reference. The motivation to combine the references is "Therefore, it would have been obvious to one of ordinary skill in the art at the time of the invention that Lee teaches implementing a chaos modulator and an incoherent receiver to receive the transmitted signal and this can be implemented in the chaotic communication system as described in Abarbanel so as to provide a receiver so as to minimize the effect of the initial conditions and synchronization errors in the demodulation of the signal received at low SNR. Furthermore, the advantage of the comparing the level to determine the received signal is that it does not require the synchronization of the receiver to the transmitter or knowledge of the transmitter", this motivation (advantage) is disclosed in the Lee reference on (Page 1183, Abstract, lines 8-17 & Page 1184, left-hand column, lines 1-11 & Page 1186, right-column, Conclusion, lines 1-16). Therefore, impermisable hindsight reconstruction to selectively combine the disjointed prior art references in an attempt to produce the claimed invention <u>has not been used</u> in the rejections.

In Regards to the argument presented in the Appeal Brief regarding the independent claims 9 & 25 (Argument, Page 7, lines 2-4) that "Nothing in the Lee

reference suggests the desirability of using an incoherent discriminator in an auto-synchronizing mirrored system in the Abarbanel reference", this is incorrect. The motivation to combine the references is "Therefore, it would have been obvious to one of ordinary skill in the art at the time of the invention that Lee teaches implementing a chaos modulator and an incoherent receiver to receive the transmitted signal and this can be implemented in the chaotic communication system as described in Abarbanel so as to provide a receiver so as to minimize the effect of the initial conditions and synchronization errors in the demodulation of the signal received at low SNR. Furthermore, the advantage of the comparing the level to determine the received signal is that it does not require the synchronization of the receiver to the transmitter or knowledge of the transmitter", this motivation (advantage) is disclosed in the Lee reference on (Page 1183, Abstract, lines 8-17 & Page 1184, left-hand column, lines 1-11 & Page 1186, right-column, Conclusion, lines 1-16). Therefore, there is desirability in combining the references.

In Regards to the argument presented in the Appeal Brief regarding the independent claims 9 & 25 (Argument, Page 7, lines 27-29) that "there is simply no teaching or suggestion in the cited references to provide the combination of features as claimed.", this is incorrect. The motivation to combine the references is "Therefore, it would have been obvious to one of ordinary skill in the art at the time of the invention that Lee teaches implementing a chaos modulator and an incoherent receiver to receive the transmitted signal and this can be implemented in the chaotic communication system as described in Abarbanel so as to provide a receiver so as

to minimize the effect of the initial conditions and synchronization errors in the demodulation of the signal received at low SNR. Furthermore, the advantage of the comparing the level to determine the received signal is that it does not require the synchronization of the receiver to the transmitter or knowledge of the transmitter", this motivation (advantage) is disclosed in the Lee reference on (Page 1183, Abstract, lines 8-17 & Page 1184, left-hand column, lines 1-11 & Page 1186, right-column, Conclusion, lines 1-16). Therefore, the Lee reference <u>does provide the teaching to combine the cited references</u>.

In regards to the arguments presented regarding independent claims 17 & 21 on (Arguments, Page 8, lines 25-29) that "reliance upon these references is further evidence of the impermissible hindsight reasoning used by the Examiner to combine disjointed pieces of the prior art in an attempt to construct the claimed invention.", <u>this is incorrect</u>. The references in question (Cutler, Giacomini and Brenman) each disclose the limitation as specified in the claims and further the Examiner provides the motivation and benefits to combine the references in the system as described in Abarbanel in view of Lee. Furthermore, even though the references are not in the field of chaotic communications, they provide the processing of the signal as is described in the instant application. Furthermore, the limitations of an incoherent discriminator in a chaotic communication are provided in the Abarbanel in view of Lee. Furthermore, the circuit components in the limitations as disclosed in the references can be implemented in multiple fields of application for modifying and

conditioning various electrical signals, and the Examiner has provided the motivation as to how they can be implemented in Abarbanel in view of Lee.

For the above reasons, it is believed that the rejections should be sustained.

Respectfully Submitted,

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